Greenprint for Akron

March 2012

A letter from the Mayor

To the Citizens of Akron:

I am proud to say that as caretakers of our environment, Akron is leading by example in environmental and energy initiatives. We are not only effectuating change in our government operations to reduce greenhouse gas (GHG) emissions which contribute to global warming, but we are inspiring change throughout our community. Our initiatives will pave the way for future generations, so that our grandchildren and their children's children can enjoy a "green" and prosperous community.

In 2007, I launched a new initiative to create a "Greenprint" for Akron. This Greenprint included a two-part local sustainability and climate action plan developed in partnership with Keep Akron Beautiful. Our Greenprint targets the most cost-effective initiatives to help the City and community reduce greenhouse gas emissions, save on energy and operational costs, and utilize those savings as a springboard to help revitalize an economy hit hard by the recession.

Akron has also become a leader when it comes to innovative solutions to environmental problems. We are one of the first cities in the nation to use an innovative, free calculator tool called the Climate and Air Pollution Planning Assistant (CAPPA) developed by ICLEI – Local Governments for Sustainability USA (ICLEI USA) to quantify and select the most cost-effective strategies to maximize energy and cost savings and to reduce greenhouse gas emissions.

Our department managers, along with Keep Akron Beautiful's President and CEO, Paula Davis, have been working hard to make our plan a reality. And their hard work has already paid off. **The City's most recent Greenhouse Gas Emissions Survey indicates a 13% reduction in government emissions from 2005 to 2009, well ahead of the plan for a 5% reduction by 2013.** I thank them for all of their hard work and effort in moving our plan forward to success.

By no means are we done, but as you can see we are well ahead of schedule. As the Greenprint is a living document, and as we learn more about our environment, we will continue to fine-tune our plan. I look forward to working with you to keep Akron in the forefront of the "green" initiative, and together we will continue to show the nation that Akron is a leader in protecting the environment.

Sincerely,

Don Plusquellic, Mayor

www.keepakronbeautiful.org/greenprintforakron

www.ci.akron.oh.us

City of Akron

2009 Community-Wide Summary Report
Greenhouse Gas Emissions Inventory

Introduction

The City of Akron recognizes that greenhouse gas (GHG) emissions from human activity are contributing to global warming and that the City must act quickly to reduce these emissions, both through its government operations and by inspiring change throughout the community. On March 31, 2008, the City of Akron, Ohio Council adopted a resolution committing the City to taking action for climate protection. Through this resolution, the City recognized the "profound effect" that greenhouse gases emitted by human activity are having on the Earth's climate, as well as the City's opportunity to reduce these emissions, both through its government operations and by inspiring change throughout the community.

The City of Akron is working to achieve multiple benefits--including saving energy and money, reducing emissions, and preserving quality of life in our community--through waste reduction efforts, energy efficiencies in its facilities and vehicle fleet, land use and transit planning, and other activities.

Presented here are estimates of greenhouse gas emissions resulting from activities in the City of Akron as a whole and from the City's government operations. A base year of 2005 was chosen due to data availability, and this baseline provided a starting point against which future performance could be compared and progress in reducing emissions could be demonstrated. This report compares emissions from that base year to emissions in 2009.

Climate Change Background

Naturally occurring gases dispersed in the atmosphere determine the Earth's climate by trapping solar radiation. This phenomenon is known as the greenhouse effect. Overwhelming evidence suggests that human activities are increasing the concentration of greenhouse gases, most notably the burning of fossil fuels for transportation and electricity generation which introduces large amounts of carbon dioxide and other gases into the atmosphere. Collectively, these gases intensify the natural greenhouse effect, causing global average surface temperature to rise, which is in turn expected to affect global climate patterns and cause climate change.

Many communities in the United States have taken responsibility for addressing climate change at the local level, due to historic Federal inaction on the issue.[1] The City of Akron could be impacted by drought that would reduce the levels of water in the Great Lakes, due to poor weather increasing air quality problems and leading to more incidents of pneumonia and respiratory illnesses, and more severe winter ice storms that could interrupt power transmission and increase property damage losses, as well as other changes to local and regional weather patterns and species migration. Beyond our community, scientists also expect changing temperatures to result in more frequent and damaging storms accompanied by flooding and landslides, summer water shortages as a result of reduced snow pack, and disruption of ecosystems, habitats, and agricultural activities. The City of Akron is exploring how to adapt to these changes.

The Cities for Climate Protection Campaign

The City of Akron, along with more than 1,000 local governments, including over 600 in the United States, has joined ICLEI's Cities for Climate Protection (CCP) campaign.[2] The CCP campaign provides a framework for local governments to identify and reduce greenhouse gas emissions, organized along five milestones:

[1] In response to the threat of climate change, communities worldwide are voluntarily reducing greenhouse gas emissions. The Kyoto Protocol, an international effort to coordinate mandated reductions, went into effect in February 2005 with 161 countries participating. The United States is one of three industrialized countries that chose not to sign the Protocol.

1. Conduct an inventory and forecast of local greenhouse gas emissions;
2. Establish a greenhouse gas emissions reduction target;
3. Develop an action plan for achieving the emissions reduction target;
4. Implement the action plan; and,
5. Monitor and report on progress.

This report represents the completion of Milestone Two. It provides a foundation for future work to reduce greenhouse gas emissions in the City of Akron.

Sustainability Activities in the City of Akron

Since 2007, when Akron's Mayor Don Plusquellic first announced that the City would develop a sustainability plan and tapped Keep Akron Beautiful with the charge to lead the process, community members, city workers, and local sustainability experts Affinity Consultants, Inc. have been working diligently to create a strategy.

Akron has chosen 7 Guiding Principles that will assist the City with moving toward sustainability. The next step will be for the Green Ribbon Panel to determine City policies that will support the Guiding Principles and provide opportunities to implement a strategic Greenprint path.

- Guiding Principle One: Akron will reduce its climate change impact.
- Guiding Principle Two: Akron will implement efficient waste management and waste reduction.
- Guiding Principle Three: Akron will promote environmental literacy.
- Guiding Principle Four: Akron will institute an environmentally, socially, and economically responsible purchasing program.
- Guiding Principle Five: Akron will seek outside funding sources and maintain fiscal prudence.
- Guiding Principle Six: Akron will promote and seek the development of green jobs.
- Guiding Principle Seven: Akron will encourage the concept of new urbanism and regional smart growth.

Methodology

The first step toward achieving tangible greenhouse gas emissions reductions requires identifying baseline levels and sources of emissions. City of Akron staff used the International Local Government GHG Emissions Analysis Protocol (IEAP) to inventory the City's community emissions, and the Local Government Operations Protocol (LGOP) to inventory GHG emissions, from City of Akron operations and buildings (evaluated as a subsector of the community inventory).

Community Emissions Protocol

The IEAP, developed by ICLEI, provides an easily implementable set of guidelines to assist local governments in quantifying greenhouse gas emissions from both their internal operations and from the whole community within their geopolitical boundaries. Staff used this protocol to inventory the City of Akron's community emissions. ICLEI began development of the IEAP with the inception of its Cities for Climate Protection Campaign in 1993, and recently formalized an official version to establish a common GHG emissions inventory protocol for all local governments worldwide.

Local Government Operations Protocol

In 2008, ICLEI, the California Air Resources Board (CARB), and the California Climate Action Registry (CCAR), released the LGOP to serve as a national appendix to the IEAP. The LGOP serves as the national standard for quantifying and reporting greenhouse emissions from local government operations. The purpose of the LGOP is to provide the principles, approach, methodology, and procedures needed to develop a local government operations greenhouse gas emissions inventory. City staff used this protocol to conduct the local government emissions inventory specifically. While the State of Ohio does not currently require local governments to inventory and report their emissions, an emissions inventory is a critical first step for the City to develop internal emissions reduction strategies and track future progress.

Establishing a Base Year and Comparison Year

A primary aspect of the emissions inventory process is the requirement to select a base year with which to compare current emissions. Due to availability of accurate data, the City of Akron's greenhouse gas emissions inventory utilizes 2005 as its base year. This report compares the 2009 data with 2005 data.

Establishing Boundaries

Community: Geopolitical Boundary

Setting an organizational boundary for greenhouse gas emissions accounting and reporting is an important step in the City's geopolitical boundary. The IEAP defines geopolitical boundary as that "consisting of the physical area or region over which the local government has jurisdictional authority." Activities that occur within this boundary can be, for the most part, controlled or influenced by the City of Akron's policies and educational programs. Although the City may have limited influence over the level of emissions from some activities, it is important that every effort be made to compile a complete analysis of all activities that result in greenhouse gas emissions.

Figure 1: Geopolitical Boundary of Akron (Akron Corporation Limits)

The City of Akron's geopolitical boundaries are its corporation limits, an area over 62 square miles, comprising almost 15% of the land in Summit County. Akron's population comprises over 35% of the total population of Summit County.

Government: Organizational Boundaries

Staff estimated the City of Akron's local government emissions based on activities and facilities for which the City maintains operational control. In some instances this may include government operations that occur outside of the City's geopolitical boundary.

Emission Types

The IEAP and LGOP recommend assessing emissions from the six internationally recognized greenhouse gases regulated under the Kyoto Protocol including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6); however, quantifying emissions beyond the three primary GHGs (CO_2, CH_4, and N_2O) can be difficult. Therefore, ICLEI has developed a means for local governments to produce a simplified inventory that includes the three primary GHGs, yet is still in accordance with the IEAP and LGOP methodology.

Quantification Methods

Greenhouse gas emissions can be quantified in two methods and both were used to generate this inventory:

[2] ICLEI was formerly known as the International Council for Local Environmental Initiatives, but the name has been changed to ICLEI – Local Governments for Sustainability.

- Measurement-based methodologies refer to the direct measurement of greenhouse gas emissions (from a monitoring system) emitted from a stack or flue of a power plant, wastewater treatment plant, landfill, or industrial facility.
- Calculation-based methodologies calculate emissions using activity data and emission factors. To calculate emissions accordingly, the basic equation below is used: *Activity Data x Emission Factor = Emissions.*

Activity data refer to the relevant measurement of energy use or other greenhouse gas-generating processes such as fuel consumption by fuel type, metered annual electricity consumption, and annual vehicle miles traveled.

CACP 2009 Software

To facilitate community efforts to reduce greenhouse gas emissions, ICLEI developed the Clean Air and Climate Protection 2009 (CACP 2009) software package in partnership with the National Association of Clean Air Agencies (NACAA) and the U.S. Environmental Protection Agency (EPA). CACP 2009 is designed for compatibility with the LGOP and determines emissions by combining activity data (energy consumption, waste generation, etc.) with verified emission factors.[3]

Greenhouse gas emissions are aggregated and reported in terms of equivalent carbon dioxide units, or CO_2e. This standard is based on the Global Warming Potential (GWP) of each gas, which is a measure of the amount of warming a greenhouse gas may cause, measured against the amount of warming caused by carbon dioxide. Converting all emissions to equivalent carbon dioxide units allows for the consideration of different greenhouse gases in comparable terms. The CACP software has been and continues to be used by over 600 U.S. local governments to reduce their greenhouse gas emissions.

The model depends upon numerous assumptions, and it is limited by the quantity and quality of available data. With this in mind, it is useful to think of any specific number generated by the model as an approximation of reality, rather than an exact value.

Evaluating Emissions

There are several important concepts involved in the analysis of emissions arising from many different sources and chemical/mechanical processes throughout the community. For both community and government operations, emissions sources are categorized according to where they fall relative to the geopolitical boundary of the community, or the operational boundaries of the government. Emissions sources are categorized as direct or indirect emissions: Scope 1, Scope 2, or Scope 3. One of the most important reasons for using the scopes framework for reporting greenhouse gas emissions at the local level is to prevent double counting for major categories such as electricity use and waste disposal.

Community Scope Definitions

The scopes framework identifies three emissions scopes for community emissions:

- **Scope 1:** Direct GHG emissions (with the exception of direct CO_2 emissions from biogenic sources) from sources located within the geopolitical boundary of the local government.
- **Scope 2:** Indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, and cooling. Scope 2 emissions occur as a result of activities that take place within the geopolitical boundary of the local government, but that occur at sources located outside of the government's jurisdiction.
- **Scope 3:** All other indirect or embodied emissions not covered in Scope 2 that occurs as a result of activity within the geopolitical boundary. Examples include emissions resulting from the extraction and production of purchased materials and fuels, transportation and commuting-related travel, outsourced activities, and waste disposal-related impacts.

Scope 1 and Scope 2 sources are the most essential components of a community greenhouse gas analysis as these sources are typically the most significant in scale, and are most likely impacted by local planning and policy making.

Local Government Scope Definitions

Similar to the community framework, the government operations sources are divided into these same three scope categories:

- **Scope 1:** Direct emissions from sources within a local government's organizational boundaries that the local government owns or controls.
- **Scope 2:** Indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, and cooling. Scope 2 emissions occur as a result of activities that take place within the organizational boundaries of the reporting entity, but that occur at sources owned or controlled by another entity.
- **Scope 3:** All other indirect emissions not covered in Scope 2, such as emissions from upstream and downstream activities that occur as a result of activities within the operational boundaries of the local government, as well as emissions resulting from the extraction of and production of purchased materials and fuels, contracted services, and waste disposal.

As with the community inventory, Scope 1 and Scope 2 sources are the most essential components of a local government greenhouse gas analysis because these sources are usually significant in scale and are directly under the control of local governments. Local governments typically have indirect control over Scope 3 emissions.

Greenhouse Gas Results

Community Emissions Inventory Results

The greenhouse gas emissions inventory for the *community* went down 6% from 2005 to 2009, which is a 1% improvement over the 5% reduction goal that was set for 2013. Yes, there were more unoccupied homes in the residential sector in 2009 but there were also more fuel efficient vehicles being driven and there were large scale reductions in community solid waste due to the implementation of efficient recycling programs.

The community inventory includes any greenhouse gases that were emitted as the result of the day to day lives of residents living within city limits; therefore, any emissions resulting from city government activity comprise a fraction of these total emissions.

Table 1: Scopes and Sectors Included in the City of Akron Community Inventory

Sector	Scope 1	Scope 2
Residential	Natural Gas	Electricity
Commercial / Industrial	Natural Gas & Point Source Emissions	Electricity
Transportation	Gasoline & Diesel	–
Waste Generation	Residential Curbside and Industrial Waste	–
Other	Point Source Emissions	–

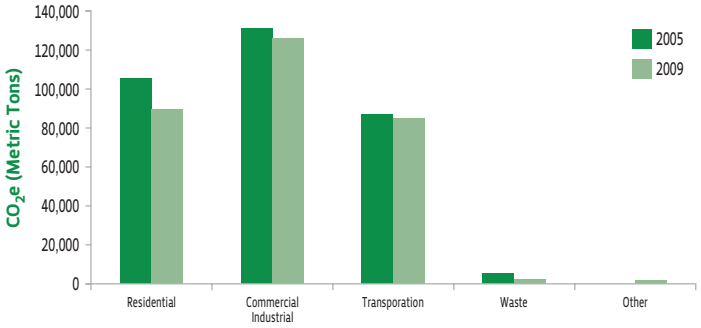
Including all scopes, the City of Akron community emitted approximately 3.28 million metric tons of CO_2e in the year 2005 and 3.08 million metric tons of CO_2e in 2009, which is reflective of a 6% reduction in greenhouse gas emissions.

[3] The emission factors and quantification methods employed by the CACP software are consistent with national and international inventory standards established by the Intergovernmental Panel on Climate Change (1996 Revised IPCC Guidelines for the Preparation of National Inventories) the U.S. Voluntary Greenhouse Gas Reporting Guidelines (EIA form 1605), and the Local Government Operations Protocol (LGOP).

Table 2: Community GHG Emissions by Sector & Scope (metric tons CO2e) demonstrate a 6% reduction from 2005 to 2009.

Sector	2005			2009		
	Scope 1	Scope 2	TOTAL	Scope 1	Scope 2	TOTAL
Residential	606,355	444,775	**1,051,130**	483,005	424,981	**907,986**
Commercial/Industrial	315,285	990,468	**1,305,753**	278,942	996,445	**1,275,387**
Transportation	874,630	–	**874,630**	859,646	–	**859,646**
Waste	49,825	–	**49,825**	27,678	–	**27,678**
Other	–	–	–	5,795	–	**5,795**
TOTAL	1,846,095	1,435,243	3,281,338	1,655,066	1,421,426	3,076,492

Figure 2: Community GHG Emissions by Sector



Per Capita Emissions

Per capita emissions can be a useful metric for measuring progress in reducing greenhouse gases. It is important to understand that this number is not the same as the carbon footprint of the average individual living in the City of Akron (which would include lifecycle emissions, resulting from air travel, etc.). This per capita emissions number is not a tool for emissions comparisons with other communities. This Emissions per Capita number is specific to each individual community and the energy sources and other services that are provided within it.

Table 3: City of Akron GHG Emissions per Capita

Sector	2005	2009
Estimated Population	208,092	200,906
Community GHG Emissions (metric tons CO_2e)	3,281,338	3,076,492
GHG Emissions/Resident (metric tons CO_2e)	15.77	15.31

Government Operations Emissions Inventory Results

The City of Akron reached its 2013 greenhouse gas emission reduction goal for government operations of 5%, down from the 2005 baseline greenhouse gas survey, as of 2009. The ICLEI CACP 2009 software calculated that total emissions for *governmental operations* decreased 13% from 2005 to 2009.

This report presents the findings and methodology of a local government operations (LGO) greenhouse gas emissions inventory for the City of Akron. The inventory measures the greenhouse gas emissions resulting specifically from the City of Akron's government operations, to facilitate detailed analysis of emissions sources. Through analysis of a local government's emissions profile, the City of Akron can tailor strategies to achieve the most effective greenhouse gas emission reductions. The following table summarizes the city government activities evaluated and indicates the primary source and associated scope.

Table 4: Scopes and Sectors Included in the City of Akron Government Inventory

Sector	Scope 1	Scope 2	Scope 3
Building and Other Facilities	Natural Gas	Electricity	–
Streetlights, Traffic Signals, and Other Public Lighting	–	Electricity	–
Water Delivery Facilities	Natural Gas	Electricity	–
Wastewater Treatment Facilities	Natural Gas & Methane Generation	Electricity	–
Airport Facilities	Natural Gas	Electricity	–
Solid Waste Facilities	Landfill Methane Generation	–	–
Steam Facilities	Natural Gas, Wood/Tire Derived Fuel Mix, Coal, Wood, & Waste Oil	–	–
Vehicle Fleet and Mobile Equipment	Gasoline & Diesel	–	–
Employee Commute	–	–	Gasoline & Diesel

In 2009, the City of Akron's greenhouse gas emissions from government operations totaled 222,532 metric tons of CO_2e, a 13% decrease from the 255,012 metric tons of CO_2e emitted in 2005. This number is a summation of Scope 1, Scope 2 and Scope 3 emissions, and is not intended to represent a complete picture of emissions from the City of Akron operations. This figure was calculated specifically to avoid double counting, and includes Scope 1, 2, and 3 emissions.

Table 5 and Figure 3 below summarize the results of the LGO greenhouse gas emissions inventory for the City of Akron, by sector and scope.

Table 5: Government GHG Emissions by Sector & Scope (metric tons CO2e) demonstrate a 13% reduction from 2005 to 2009.

Sector	2005				2009			
	Scope 1	Scope 2	Scope 3	TOTAL	Scope 1	Scope 2	Scope 3	TOTAL
Steam Plant	128,717	–	–	**128,717**	113,733	–	–	**113,733**
Building & Facilities	3,623	19,848	–	**23,470**	3,680	18,538	–	**22,218**
Streetlights & Traffic Signals	–	14,077	–	**14,077**	–	14,013	–	**14,013**
Water Delivery Facilities	1,234	11,606	–	**12,840**	1,095	11,594	–	**12,690**
Airport Facilities	2	6	–	**8**	45	8	–	**53**
Wastewater Facilities	1,294	16,420	–	**17,714**	9,502	16,663	–	**26,165**
Solid Waste Facilities	41,631	–	–	**41,631**	–	19,561	–	**19,561**
Vehicle Fleet	14,307	–	–	**14,307**	12,371	–	–	**12,371**
Employee Commute	–	–	2,247	**2,247**	–	–	1,729	**1,729**
TOTAL	190,808	61,957	2,247	255,012	140,426	80,377	1,729	222,533

Figure 3: Government GHG Emissions by Sector

*Akron observed an increase in greenhouse gas emissions within the wastewater facilities sector in 2009 primarily due to methane generated by the Anaerobic Digestion System (Biogas Project) Pilot program in 2008. This pilot proved the concept of Anaerobic Digestion at the Water Pollution Control plant. The final phase of this Biogas Project is now under construction and is expected to be completed in 2013. When completed, electricity will be generated from 100% of the methane produced by the process.

Climate Action Planning

The City of Akron's Climate Action Plan was completed using ICLEI's Climate and Air Pollution Planning Assistance (CAPPA) software tool to identify and evaluate specific climate reduction measures by providing details about their potential greenhouse gas reductions.

This inventory identifies the major sources of emissions from Akron's operations and, therefore, where policymakers will need to target emissions reductions activities if they are to make significant progress toward adopted targets. Whenever possible, reduction strategies include cost-saving projects that both reduce costs (such as energy bills) and greenhouse gas (GHG) emissions. These include the "low hanging fruit", which is important because it frequently represents win-win situations in which there is no downside to implementation. Selecting these projects in the order of largest to smallest benefit ensures that solid, predictable returns can be realized locally. These projects lower recurring expenditures, save taxpayer dollars, create local jobs, and benefit the community environmentally. The following list contains a few of the planned governmental and community-wide strategies that the City of Akron is currently considering.

Governmental Operations

- Conversion of heat system at the Akron Water Plant from steam to natural gas and electric heat.
- Completion of LED lighting retrofits for traffic lights and pedestrian signals throughout the City of Akron.
- Expansion of LED lighting retrofits and day-lighting controls for parking decks throughout the City of Akron.

Community-Scale

- Summit County energy efficiency projects planned for eight county buildings.
- Energy Efficiency Conservation Block Grant funds utilized for community-based grant programs.
- Residential efficiency education and outreach activities supported by City of Akron and Keep Akron Beautiful.

The City of Akron utilized ICLEI's Climate and Air Pollution Planning Assistance (CAPPA v1.3) tool to identify and evaluate specific climate reduction strategies and measures and estimate the potential associated GHG reductions.

There were many steps involved in the development of the Climate Action Plan including project evaluations, meetings, communications, and multiple CAPPA tool illustrations. The process phases involved were as follows.

Phase 1 - Conducted a preliminary review of the current projects and actions compiled by each Smart Committee to determine which measures/actions may result in favorable GHG reductions.

Phase 2 - Smart Committee provided specific details that assisted in the quantification of GHG reductions from each measure/action identified. CAPPA suggested measures were also discussed with Smart Committee members to assess probable implementation. This data gathering phase required a significant amount of time and effort including: research and follow-up correspondence with Smart Committee members, additional members of the City, and other identified contacts (e.g., county, industry, public transit, etc.) who could provide the necessary information to evaluate specific measures.

Phase 3 - Data gathered and collected in prior phase were organized and entered into ICLEI's CAPPA tool so that Climate Action Plans for both the government operations and the community could be developed.

Phase 4 - Identified measures were quantified based on their perceived and expected benefit(s) including: initial implementation cost, operation and maintenance costs, financial return on investment, implementation timeframe, level of effort required by City of Akron, and degree of implementation control held by City of Akron.

The CAPPA tool prioritizes the list of measures/activities with the greatest alignment to the City's preferred benefit criteria. CAPPA performs this selection process until the available measures reach the targeted reduction goal, or until all measures are exhausted.

Phase 5 - This phase of the project involved the generation of the initial Governmental Operations and Community-Wide Climate Action Plans for the City of Akron.

Phase 6 - Following the generation of the initial set of Climate Action Plans, key members of each Smart Committee reconvened to select the appropriate measures for implementation, as well as, identify implementation timeframes, responsible parties, and likely funding mechanisms. Measures were grouped into four timeframe categories: long-term (greater than 5 years), short-term (less than 5 years), short-term & long-term, and complete. This phase resulted in the generation of separate Climate Action Plans for both governmental operations and the community.

Phase 7 - This final phase involved documenting the projects and measures which have been completed or are in process. This is an ongoing process phase that aims to gather specific information pertaining to each measure including investment amount, cost savings, payback timeframe, energy savings (e.g., electricity, natural gas, steam, fuel), and GHG emissions savings. This phase is critical to documenting and eventually reporting the multiple benefits realized as a result of the City's Climate Action Plan. Completion of this phase resulted in the development of a Climate Action Plan tracking document.

The identified strategies contained within the Climate Action Plan focus on achieving both governmental and community-wide GHG emissions reductions in an effort to meet the 2013, 2018, and 2025 established goals. These plans are "living" documents that may be updated as projects, plans, and activities arise or change within the local government or the community.

Using these strategies as part of a detailed overall emissions reductions strategy, Akron anticipates reducing its impact on climate change, improve the quality of its services, reduce costs, stimulate local economic development, and inspire residents and businesses to intensify their own efforts to combat climate change.

The short and long term reduction measures which have been mapped out for the city administration by Affinity Consultants, Inc. in the city's Climate Action Plan, demonstrate for government operations there is a total potential for an estimated 35,319 metric tons CO2e reduction in greenhouse gas emissions. If these measures are implemented the City of Akron will have the ability to surpass the absolute targets set through 2018 and making significant progress towards meeting the 2025 targeted goal.

Credits and Acknowledgements

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Smart Transit

The City of Akron has experienced a large drop-off in monthly kWh usage at end of 2010/beginning of 2011, due to the effect of the replacements of 45% (as of June 2011) of the incandescent traffic signals to LED bulbs through use of the EECBG funds. The consistent drop from 2006 to 2010 is related to LED replacements as part of Capital Projects. Regarding maintenance, to date we have only replaced 28 of the 3,500 LED red lights that were installed in 2003. We are past the five year warranty and beginning to evaluate when it may be necessary to replace these. The LED retrofit has also significantly reduced the City's maintenance costs associated with bulb replacement (e.g., man-hours). The City is now evaluating how we can utilize the *FirstEnergy* rebate program to complete the remainder of the traffic signal and pedestrian signal replacements.

Smart Community Education & Promotion of Progress

Keep Akron Beautiful was awarded, in partnership with the Akron Public Schools and the Ohio Energy Project (OEP), a 2008 Ohio Environmental Education Fund (OEEF) grant for $50,000. This grant was targeted for sixth grade science teachers and their students. The grant provided a series of 7 interactive energy efficiency lessons from the OEP curriculum, Be E3 Smart, to 2,000 public school students. Each child trained received a Home Energy Efficiency Kit to start their family on saving energy and natural resources. Kits have also been given to the Green Ribbon Panel, all Keep Akron Beautiful Board members, Akron Public School Board members, Leadership Akron classes, Boys and Girls Clubs, etc. The estimated energy savings were 605,400 kilowatt hours or a monetary savings of $37,800 by June, 2011.

Smart Green Jobs

The Akron Global Business Accelerator (AGBA) currently has 20% of its space at three facilities devoted to clean technologies. That space amounts to 15% of the companies housed at the AGBA and 10-15% of the investment created at the City's incubator devoted to cleaner and more efficient energy use.

Smart Energy & Emissions

The City of Akron retrofitted the Akron Centre Deck (Super Block) with LED (Light Emitting Diodes) lights. 564 lights were installed. The annual energy savings will be $68,226 and the return on investment will take 5-6 years. As part of the City's Energy Efficiency and Conservation Block Grant (EECBG), new LED lighting will be installed in the first floor of the Cascade Parking Deck. The new Morley Parking Deck lights that run 24/7, save 130,644 Kwh per year, translating into 94 tons of Co2 emissions saved.

Smart Conservation of Natural Resources

The City's Engineering Bureau is spearheading a city-wide tree inventory. A database has been created to gather the necessary information. This information will be available to all city departments utilizing the City's GIS to create work orders and track the maintenance history of a tree. The City has devoted the technical expertise and the manpower to use I-Tree, a free software package developed by the U.S. Forest Service and Davey Tree, to maintain the urban forest. With time, this system will help Akron quantify ecosystem services for individual trees or tree populations. By the end of 2011, the City's Engineering Bureau had completed 38% of the 70,000 street tree locations necessary to complete inventory.

Smart Water and Wastewater Management

The Anaerobic Digestion System (ADS)/ Biogas Project has been operational since April 2008. The system is generating enough methane gas to power its 335 kilowatt (kW) generator at full power while processing only one-third of the biosolids generated by the wastewater treatment plant. The system produced an average of 220,000 kWh per month of electricity during 2010, enough electricity to supply approximately 250 homes. After a successful three-year demonstration period, the City of Akron has completed the design to build additional digestion capacity to process all of the biosolids from the wastewater treatment plant, resulting in a potential generation capacity of up to 1,200 kW. Construction of this second phase of the ADS process began in the fall of 2011 with completion scheduled sometime in the spring of 2013.

The City already has in place a system to recover landfill gas (LFG) emitted from the former Hardy Road Landfill. In October 2011, the City announced a project that will transport this gas to the adjacent wastewater treatment plant to produce electricity for facility, rather than flaring or venting this gas to the atmosphere. Using LFG helps to reduce odors and other hazards associated with LFG emissions, and it helps prevent methane from migrating into the atmosphere and contributing to local smog and global climate change. The project is designed to produce approximately 7,000 megawatt hours of electricity annually for the wastewater treatment plant, or enough electricity to power about 600-700 homes. The electricity generated from the landfill gas will supply about 30% of the wastewater plant's annual electric requirements. The system is projected to be operational by fall 2012.

Smart Development

The City of Akron Energy Efficient Conservation Block Grant (EECBG) is a federal program initiated through the U.S. Department of Energy and funded through the American Relief and Recovery Act of 2009. The City of Akron budgeted $325,000 for the Residential Energy New Construction Rebate Program.

This program established financial incentives to assist prospective individual private property home owners with new residential single-family home construction projects with energy efficiency benchmarks. The incentives were designed to make the building process more affordable as the home owner pursues energy efficient and/or renewable technologies. In addition, the home owner would incur lesser annual and lifetime operating expenses.

Applicants were required to follow the Department of Energy's E-Scale performance path based on the Home Energy Rating System (HERS) to indicate a home's efficiency. The City of Akron required that new construction achieve a minimum of 50 on the E-Scale – indicating the home is 50% more efficient than a typical newly built home. In addition, the home had to be rated by third-party verifier from the Residential Energy Services Network (RESNET). Funds were available January 2011 thru March 2012. Construction had to be completed by July 2012. The City of Akron provided cash rebates to builders or homeowners that came in the form of a check to the applicant that met benchmarks for required energy efficiency in the newly constructed home. This rebate was offered to consumers who were in the process or who were planning to build a new single family residential home. Rebates ranged from $15,000 to $25,000 for qualified new houses.

Smart Materials & Solid Waste Management

City of Akron has awarded Greenstar Recycling a 10-year contract to process curbside recyclables. Greenstar will construct a state-of-the-art, single stream recycling processing facility within the corporate limits of Akron that will serve as a hub for recycling and recovery activities in the area, and will bring to the City new investment and a minimum of 45 new green jobs. The goal is for the plant located at the Akron Fulton International airport to handle 4,500 tons a month from Akron and other communities. Vadxx Energy LLC, using its newly developed and innovative processing technology will convert the recycled plastics into a top grade low sulfur synthetic crude oil. This joint venture could process 12,000 tons of plastics 80,000 barrels of oil annually.